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# **Stress, cognitive appraisal, and psychological health: Testing instruments for health professionals**

## **Abstract**

The job of health professionals, including nurses, is considered inherently stressful (Lee & Wang, 2002; Rutledge et al., 2009), and thus it is important to improve and develop specific measures that are sensitive to the demands that health professionals face. This study analysed the psychometric properties of three instruments that focus on the professional experiences of nurses in aspects related to occupational stress, cognitive appraisal, and mental health issues. The evaluation protocol included the Stress Questionnaire for Health Professionals (SQHP; Gomes, 2014), the Cognitive Appraisal Scale (CAS; Gomes, Faria, & Gonçalves, 2013), and the General Health Questionnaire-12 (GHQ-12; Goldberg, 1972). Validity and reliability issues were considered with statistical analysis (i.e. confirmatory factor analysis, convergent validity, and composite reliability) that revealed adequate values for all of the instruments, namely, a six-factor structure for the SQHP, a five-factor structure for the CAS, and a two-factor structure for the GHQ-12. In conclusion, this study proposes three consistent instruments that may be useful for analysing nurses' adaptation to work contexts.

**Keywords:** Occupational stress; Cognitive appraisal; Health; Nurses.

## **Stress, Cognitive Appraisal and Psychological Health:**

### **Testing Instruments for Health Professionals**

The work of health professionals, including nurses, is considered inherently stressful because they have to face a number of sources of stress in their jobs, such as long work days, time pressure, sleep deprivation, high expectations from others, and a low tolerance for error (Lee & Wang, 2002; Rutledge et al., 2009). These indications from the literature highlight the need for the development of reliable measures to evaluate more accurately the factors related to nurses' work experiences and health. Taking into account this need, this study analysed three measures that aim to capture the professional experiences of nurses in aspects related to occupational stress, cognitive appraisal, and mental health problems. The choice of this set of instruments derives from the need to not only analyse the sources of occupational stress but also test the relationship between stress (as an antecedent variable), cognitive appraisal (as a mediating variable), and mental health (as a consequence variable). This option could help understand the processes involved in human adaptation to stress in health professionals being important to have valid measures to study these relations.

The measure of occupational stress used in this study was the Stress Questionnaire for Health Professionals (SQHP; Gomes, 2014). This measure evaluates six sources of occupational stress, such as aspects related to work and family affairs (e.g., managing clients, relationships at work, and home-work interface), aspects related to specific nursing tasks and the time available to achieve them (e.g., leading training activities and work overload), and also aspects related to career progression and salary. By proposing the SQHP, this study also addresses the important topic of evaluating not only general sources of stress at work but also respond to the need to develop measures that are sensitive to particular types of professions and their specific contexts (Sparks & Cooper, 1999). Concerning construct validity, previous findings have demonstrated a six-factor structure for the SQHP (Gomes, 2014); however, no

data exist about its validation for a specific professional group (e.g., nurses) and the factor structure was never tested using more robust data analysis techniques, such as confirmatory factor analysis (CFA).

The second instrument used in this study was the Cognitive Appraisal Scale (CAS; Gomes, Faria, & Gonçalves, 2013). This measure evaluates two types of cognitive appraisal, namely, the primary appraisal (e.g., work importance, threat perception, and challenge perception) and the secondary appraisal (e.g., coping potential and control perception). The instrument is based mainly on the Cognitive, Motivational, and Relational model of Lazarus (1991) namely the dimensions of work importance, threat perception, challenge perception, and coping potential, and also on the Job Demands-Control model proposed by Karasek (1979) namely the dimension of control perception. Both models suggest that stress and distress in organisational settings are not caused by the person or the work environment alone. On the contrary, stress and distress result from a functional combination of both the person and the work environment (Lazarus & Cohen-Charash, 2001). The importance of using measures of cognitive appraisal in the health domain relates to evidence that nurses face several job demands with few external resources available (Bourbonnais, Comeau, & Vézina, 1999; Demerouti, Bakker, Nachreiner, & Schaufeli, 2000). Therefore, it becomes important to analyse the processes of cognitive appraisal related to the way nurses assess each specific stressful situation and the way they attempt to manage their problems.

The third instrument used in this study was the General Health Questionnaire-12 (GHQ-12; Goldberg, 1972, Goldberg & Williams, 1988). The GHQ-12 is one of the most well-known instruments designed to evaluate minor psychiatric disorders; however there is still debate about the factorial structure, which can be organized by a two- or three-factor structure (Goldberg & Williams, 1988; Werneke, Goldberg, Yalcin, & Üstün, 2000). Because the factor structure is not consensual among studies, and because there is evidence that both stress and

cognitive appraisal are related to psychological problems and psychiatric disorders (Bigatti, Steiner, & Miller, 2012; Goble & Le Grande, 2008), this study tested the psychometric characteristics of the GHQ-12 in nursing professionals.

## **Method**

### **Participants**

The sample consisted of 2310 nurses. They worked mainly at public hospitals in Portugal ( $n = 1320$ ; 57.1%). The majority of them were female ( $n = 1898$ , 82.2%) and single ( $n = 1087$ ; 52.5%) with ages between 21 and 66 years old ( $M = 33.74$ ;  $SD = 9.41$ ). Nurses worked mainly in different medical services ( $n = 840$ , 36.4%), followed by emergency and intensive care services ( $n = 261$ , 11.3%), and surgical services ( $n = 232$ , 10%).

### **Procedure**

This study was conducted in accordance with the internal guidelines of the Research Centre of Psychology of the first author-affiliated university, and it conformed to both national and European regulations regarding research with human participants and the management of personal data. The study began by contacting the Portuguese Professional Association of Nurses (PPAN) to present the research goals and the procedures to collect the data. The study used an online questionnaire sent to each participant. In this way, all of the nurses working in Portugal were invited to participate in this study. In total, there were 62566 nurses registered in the PPAN, and 2310 nurses participated in the study (the return rate was 3.7%).

## Measures

*Stress Questionnaire for Health Professionals* (SQHP; Gomes, 2014). This instrument evaluates the sources of stress that health professionals face in their activities with 25 items distributed across the following six stress dimensions: (a) working with clients (e.g., “Manage serious problems of my clients”), (b) work overload (e.g., “Lack of time to perform all my professional activities”), (c) career progression and salary (e.g., “Absence of opportunities for career development”), (d) relationships at work (e.g., “Interpersonal conflicts with my colleagues”), (e) leading training activities (e.g., “Carry out training activities under my responsibility”), and (f) home-work interface (e.g., “Lack of time to be with my family and friends”). The items measure the intensity of stress on a 5-point Likert scale (0 = *No stress*; 4 = *High stress*).

*Cognitive Appraisal Scale* (CAS; Gomes et al., 2013). This instrument evaluates primary and secondary cognitive appraisals. Primary cognitive appraisal was assessed with the following three dimensions: (a) work importance (e.g., “My job means nothing at all to me/means a lot to me”); (b) threat perception (e.g., “My job is not at all disturbing to me/is very disturbing to me”); and (c) challenge perception (e.g., “My job is not at all exciting to me/is very exciting to me”). Secondary cognitive appraisal was assessed with the following two dimensions: (d) coping potential (e.g., “To what extent do you think you are prepared to deal and solve the demands of your job?”); and (e) control perception (e.g., “To what extent do you feel that what happens in your job depends on you?”). Each item was measured on a 7-point Likert scale.

*General Health Questionnaire-12* (GHQ-12; Goldberg, 1972, Goldberg & Williams, 1988; Portuguese translation by McIntyre, McIntyre, & Redondo, 1999). This instrument is one of the most well-known and widely used self-report tools for measuring general psychological health. The GHQ-12 is used to evaluate changes in affective and somatic symptoms relative to

usual levels of health (e.g., “Have you recently been feeling unhappy and depressed?”). The version used in this study contains 12 items, with responses answered on a 4-point scale (e.g., 1 = *Better than usual*; 4 = *Much less than usual*).

## **Data Analysis**

Confirmatory factor analysis was performed to test the factorial validity of the instruments. To assess model fit, it was used the  $\chi^2$  goodness-of-fit statistic, the root mean square error of approximation (RMSEA), the Tucker-Lewis index (TLI), the normed fit index (NFI), and the comparative fit index (CFI). Additionally, the reliability of the factors was analysed with the estimation of composite reliability and the convergent validity of the factors was analysed with the measurement of the average variance extracted for each factor. All analyses were conducted in AMOS (v. 20, SPSS Inc, Chicago, IL).

## **Results**

Beginning with the Stress Questionnaire for Health Professionals, the CFA for a six-factor model (e.g., managing clients, work overload, career progression and salary, relationships at work, leading training activities, and home-work interface) presented an acceptable fit ( $\chi^2(259\ df) = 2072.354$ ,  $p < 0.001$ ; RMSEA = 0.055, 90% C.I. [0.053; 0.057]; CFI = 0.929; NFI = 0.920; TLI = 0.918). To ensure that the six-factor model best represented the factor structure of the SQHP, an alternative one-factor model of stress was also tested. The results revealed unacceptable fit ( $\chi^2(275\ df) = 13418.750$ ,  $p < 0.001$ ; RMSEA = 0.144, 90% C.I. [0.142; 0.146]; CFI = 0.484; NFI = 0.480; TLI = 0.438).

For the Cognitive Appraisal Scale, three alternative models were tested, namely, a one-factor model, a two-factor model (e.g., primary cognitive appraisal and secondary cognitive appraisal), and a five-factor model (e.g., work importance, threat perception, challenge

perception, coping potential, and control perception). For the one-factor model, the results revealed unacceptable fit  $\chi^2(90\ df) = 9853.880$ ,  $p < 0.001$ ; RMSEA = 0.217, 90% C.I. [0.213; 0.220]; CFI = 0.468; NFI = 0.466; TLI = 0.379, and the two-factor model results also revealed unacceptable fit  $\chi^2(89\ df) = 7809.578$ ,  $p < 0.001$ ; RMSEA = 0.194, 90% C.I. [0.190; 0.197]; CFI = 0.579; NFI = 0.577; TLI = 0.504. The best results were obtained for the five-factor model ( $\chi^2(80\ df) = 555.785$ ,  $p < 0.001$ ; RMSEA = 0.051, 90% C.I. [0.047; 0.055]; CFI = 0.974; NFI = 0.970; TLI = 0.966).

Finally, for the General Health Questionnaire, three factor solutions were tested (one-factor, two-factor, and three-factor models). The results of the CFA for the two-factor model (e.g., social dysfunction and anxiety/depression) revealed the best fit with the data:  $\chi^2(53\ df) = 941.249$ ,  $p < 0.001$ ; RMSEA = 0.085, 90% C.I. [0.080; 0.090]; CFI = 0.912; NFI = 0.907; TLI = 0.890. The results for the three-factor model (anxiety/depression, social dysfunction, and loss of confidence) and one-factor model had unacceptable fit. For the one-factor model the results were  $\chi^2(54\ df) = 1991.397$ ,  $p < 0.001$ ; RMSEA = 0.125, 90% C.I. [0.120; 0.129]; CFI = 0.808; NFI = 0.803; TLI = 0.765. For the three-factor model the results were  $\chi^2(51\ df) = 656.835$ ,  $p < 0.001$ ; RMSEA = 0.172, 90% C.I. [0.167; 0.177]; CFI = 0.840; NFI = 0.835; TLI = 0.822.

The standardised factorial weights values were all acceptable for the three instruments with  $\lambda$  values above 0.5 (more information about these results can be obtained by contacting the first author of this paper).

The factors validated in the three CFAs were analysed in terms of reliability (CR) and convergent validity (AVE). The CR and AVE values for all the dimensions assumed acceptable values of reliability (CR values  $> .70$ ) and convergent validity (AVE values  $> .50$ ). Only the social dysfunction factor on the General Health Questionnaire presented a weak convergent validity score with this sample (i.e., AVE = .493).



The Stress Questionnaire for Health Professionals and the Cognitive Appraisal Scale are presented in the appendix of this work (the GHQ can be found in the works of Goldberg, 1972 and Goldberg & Williams, 1988).

## **Discussion**

Overall, the SQHP, CAS, and GHQ-12 instruments represent valid measures for capturing the personal and professional experiences of nurses. Regarding the SQHP, the correlated six-factor model (namely, working with clients, work overload, career progression and salary, relationships at work, leading training activities, and home-work interface) assumed a better fit than did the alternative one-factor model. The only issue was the error correlation between items 3 and 10 on the career progression and salary dimension; a possible explanation for this correlation is the tendency of both items to refer to difficulties experienced by the professionals regarding their career progression. However, the most important aspect is the fact that this correlated six-factor structure proposes significant broad domains of stress that nurses have to face, including stress related to managing clients, work, and family affairs; stress related to specific tasks that nurses have to do and the time available to accomplish them; and also stress related to career progression and salary. This effort to capture general and specific sources of stress in the health domain is based on the proposal that work stress is related with the type of work activity and with the particular contexts in which it occurs (Sparks & Cooper, 1999). For these reasons, and as reinforced by Van Vegchel, de Jonge, Bosma, and Schaufeli (2005), research should use situation-specific dimensions to augment the complexity and predictive power of occupational stress models.

Regarding the Cognitive Appraisal Scale, the five-factor model assumed the best fit (e.g., work importance, threat perception, challenge perception, coping potential, and control perception) evaluating primary cognitive appraisal and also secondary cognitive appraisal that

is not considered in some other measures of cognitive appraisal (e.g., Verhaeghe, Vlerick, Gemmel, Van Maele, & De Backer, 2006). In this way, the instrument evaluates important theoretical constructs (Karasek, 1979; Lazarus, 1991) that can explain why some professionals seem to adapt more positively than do others to their work contexts.

Finally, for the General Health Questionnaire, the two-factor model (e.g., social dysfunction and anxiety/depression) assumed a better fit with the data. The results of this study are consistent with other studies that suggest that the best factor structure for the GHQ-12 is represented by an anxiety/depression factor and a social dysfunction factor (see Gureje, 1991; Picardi et al., 2001; Politi, Piccinelli, & Wilkinson, 1994; Schmitz, Kruse, & Tress, 1999; Werneke et al., 2000). Moreover, our results showed the adequacy of this instrument for health professionals, specifically nurses.

Despite the positive findings of this study, it is important to say that the psychometric properties of a given instrument are always dependent on the characteristics of data collected and are best known when applied to different independent samples. Besides, results suggest good internal validity indices and acceptable composite reliability measures and, therefore, we encourage the use of these instruments in additional studies that include construct-related measures for external validity purposes. From a transactional perspective, using this set of instruments can help to capture the dynamic process between stress (antecedent variable), cognitive appraisal (mediating variable), and mental health problems (consequent variable) being possible to analyse the processes that link the individual to the environment and the way individuals respond to situations that are appraised as taxing or exceeding their resources (Lazarus & Folkman, 1984).

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### SQHP

Below are presented some potential sources of stress in the professional activity of health professionals. Please mark with a circle the number that best indicates the level of stress generated by each potential source of stress in the exercise of your professional activity (0 = No stress, 2 = Moderate stress; 4 = Very high stress).

In this questionnaire, some items use the term "client" to identify the persons to whom you provide services, care, treatment, or instruction. When responding to these items, please think about the persons to whom you provide your services even though you may use another designation in your work to refer to them.

	No stress			High stress		
1. Make decisions where mistakes can have serious consequences for my clients	0	1	2	3	4	
2. Covert favoritism and/or discrimination in my workplace	0	1	2	3	4	
3. Absence of opportunities for career development	0	1	2	3	4	
4. Have periods of work with many hours of activity	0	1	2	3	4	
5. Have interpersonal problems with my family and other important persons to me due my responsibilities at work	0	1	2	3	4	
6. Make public presentations due my duties at work	0	1	2	3	4	
7. Lack of encouragement and support from superiors	0	1	2	3	4	
8. Not being able to respond to what clients expect from me	0	1	2	3	4	
9. The social climate and interpersonal relations in my workplace	0	1	2	3	4	
10. No opportunities to progress in my career	0	1	2	3	4	
11. Lack of stability and security in my marriage and/or personal life due to my responsibilities at work	0	1	2	3	4	
12. Overwork related to bureaucratic tasks	0	1	2	3	4	
13. Receive a low salary	0	1	2	3	4	
14. Manage serious problems of my clients	0	1	2	3	4	
15. Interpersonal conflicts with my colleagues	0	1	2	3	4	
16. Lack of time to perform all my professional activities	0	1	2	3	4	
17. Live with the financial resources I have	0	1	2	3	4	
18. Prepare training activities to do at my workplace	0	1	2	3	4	
19. Lack of social and emotional support outside of my work (ex: family, friends)	0	1	2	3	4	
20. Feel that there is nothing I can do to solve the problems of my clients	0	1	2	3	4	
21. Inadequate or inappropriate behaviors of my colleagues at work	0	1	2	3	4	
22. Overload or overwork	0	1	2	3	4	
23. Have an insufficient salary	0	1	2	3	4	
24. Carry out training activities under my responsibility	0	1	2	3	4	
25. Lack of time to be with my family and friends	0	1	2	3	4	

<b>Items dimensions</b>	(a) Working with clientes: 1, 8, 14, 20	(d) Relationships at work: 2, 7, 9, 15, 21
	(b) Work overload: 4, 12, 16, 22	(e) Leading training activities: 6, 18, 24
	(c) Career progression and salary: 3, 10, 13, 17, 23	(f) Home-work interface: 5, 11, 19, 25

**Note:** Mean scores are calculated in order to obtain the values of the six subscales. The highest values in each dimension indicate higher perception of stress by health professionals.

### CAS (General version)

Below are some questions related to your work activity. Please mark with a circle the number that best indicates how you **usually feel** in your professional activity.

	<b>Is not important to me</b>		<b>Is somewhat important to me</b>		<b>Is very important to me</b>		
1. My job...	0	1	2	3	4	5	6
	<b>Does not matter to me</b>		<b>Matters somewhat to me</b>			<b>Matters a lot to me</b>	
2. My job...	0	1	2	3	4	5	6
	<b>Means nothing to me</b>		<b>Means something to me</b>			<b>Means a lot to me</b>	
3. My job...	0	1	2	3	4	5	6
	<b>Is not disturbing to me</b>		<b>Is somewhat disturbing to me</b>			<b>Is very disturbing to me</b>	
4. My job...	0	1	2	3	4	5	6
	<b>Is not threatening to me</b>		<b>Is somewhat threatening to me</b>			<b>Is very threatening to me</b>	
5. My job...	0	1	2	3	4	5	6
	<b>Is not negative to me</b>		<b>Is somewhat negative</b>			<b>Is very negative to me</b>	
6. My job...	0	1	2	3	4	5	6
	<b>Is not stimulating to me</b>		<b>Is somewhat stimulating to me</b>			<b>Is very stimulant to me</b>	
7. My job...	0	1	2	3	4	5	6
	<b>Is not exciting to me</b>		<b>Is somewhat exciting to me</b>			<b>Is very exciting to me</b>	
8. My job...	0	1	2	3	4	5	6
	<b>Is not challenging to me</b>		<b>Is somewhat challenging to me</b>			<b>Is very challenging to me</b>	
9. My job...	0	1	2	3	4	5	6
			<b>Not able at all</b>		<b>Somewhat able</b>		<b>Very able</b>
10. To what extent do you think you are able to deal and solve the demands of your job?	0	1	2	3	4	5	6
			<b>Not prepared at all</b>		<b>Somewhat prepared</b>		<b>Very well prepared</b>
11. To what extent do you think you are prepared to deal and solve the demands of your job?	0	1	2	3	4	5	6
			<b>Not able at all</b>		<b>Somewhat able</b>		<b>Very able</b>
12. To what extent do you think you are able to have a good performance in your job?	0	1	2	3	4	5	6
			<b>Does not depends on me</b>		<b>Depends somewhat on me</b>		<b>Depends on me</b>
13. To what extent do you feel that what happens in your job depends on you and your abilities?	0	1	2	3	4	5	6
			<b>Low control</b>		<b>Some control</b>		<b>High control</b>
14. To what extent do you feel that you control what should be done in your work?	0	1	2	3	4	5	6
			<b>Low power of decision</b>		<b>Some power of decision</b>		<b>High power of decision</b>
15. To what extent do you feel that you have the power to decide what to do in your work?	0	1	2	3	4	5	6

<b>Items</b>	(a) Work importance: 1, 2, 3	(d) Coping potential: 10, 11, 12
<b>dimensions</b>	(b) Threat perception: 4, 5, 6	(e) Control perception: 13, 14, 15
	(c) Challenge perception: 7, 8, 9	

**Note:** The scores on the scales are obtained by individually adding and dividing each result. Therefore, high scores on each scale indicate higher perceptions of work importance, threat and challenge perceptions, coping potential, and control perception.